

Summaries

UDC 519.644

E.A. Shamsiev**ON DIFFERENT CUBATURE FORMULAS FOR 3D SPHERE**

Cubature formulas of $(4p-1)$ and $(4p+1)$ accuracy grade to calculate integrals on the surface of 4D space were drawn. It was shown that the maximum possible algebraic degree of accuracy was obtained. Formulas of 4 and 6 accuracy grade were also considered.

UDC 539.182

V.A. Kilin, R.Yu. Kilin**ESTIMATION OF AMPLITUDES AND PROBABILITY POINTS OF MULTIELECTRON TRANSITIONS IN ATOMS BASED ON MULTIFREQUENCY PERTURBATION THEORY**

Approach to obtain approximate formulas for the estimation of amplitudes and probability points of multielectron transitions in atoms is considered. Approximation formulas were obtained on the basis of accurate expressions and were physically proved in the framework of definite order perturbation theory. The given approach allows not only to estimate the probability of transitions and processes cross-section but reveals the possibility to depict dominating physical transitions mechanisms. Approximations of shocks, resonance in continuous spectrum, resonance in discrete spectrum, nonorthogonal orbitals were discussed.

UDC 621.314

E.E. Slyadnikov**DYNAMICS OF ORDER PARAMETER IN STRUCTURALLY FIRE-RESISTANT CRYSTAL**

It is theoretically proved that soft water in the area of structural transition "initial structure – pretransition state – final structure" is caused by both temperature change and the external power, and correspondingly, the dynamics is of a relaxed character.

UDC 533.75

V.I. Boiko, Yu.V. Daneikin, K.V. Yushitsin**DESCRIPTION OF STATE PARAMETERS OF A SUBSTANCE IN DYNAMICS MODELING PROBLEMS OF A SYSTEM "CONCENTRATED ENERGY FLOW – METAL"**

Model to describe state parameters of metals experiencing strong energy influence is suggested. Model efficiency in a wide range of density and temperature changes is shown. Fundamental nature of physical principles that form the basis for the model allowed to obtain new results while considering classical problems of hydrodynamics.

UDC 535.36

B.V. Goryachev, S.B. Mogilnitsky**RADIATION TRANSITION IN THE DISPERSION MEDIUM WITH PARTICLES OF AN ARBITRARY SIZE**

New approach to the problem of radiation transition in the dispersion medium based on the use of the dispersion indicatrix of radiation in the form of integral parameters calculated on the basis of two indicatrices presented in mutually perpendicular planes is considered. Such dispersion indicatrix of radiation is adapted to the current methods of radiation transition. Result analysis is carried out using skewness coefficients of the dispersion indicatrix of radiation and brightness body of the dispersed volume.

UDC 550.42:553.96/97(571.1)

S.I. Arbuzov, L.P. Rikhvanov, S.G. Maslov, V.S. Arkhipov, Z.I. Pavlov**ABNORMAL GOLD CONCENTRATIONS IN BROWN COALS AND PEATS OF SOUTH-EAST REGION OF WESTERN-SIBERIAN FORMATION**

Data on gold content in coals and peats of South-East region of Western-Siberian formation are described. Coal formations with abnormally high Au concentrations are considered for the first time. Basic conditions of accumulation and distribution of abnormal Au concentrations in coal-bearing deposits and peats are established. Forms of Au presence in peats are investigated. Accumulation model of high Au concentrations in peats and brown coals of the region is suggested.

UDC 624.131.4

K.I. Kuzevanov, E.M. Dutova, D.S. Pokrovsky**USE OF GEOINFORMATION TECHNOLOGIES IN THE INVESTIGATION OF PROCESSES OF MAN-CAUSED UNDERFLOODING OF URBAN TERRITORIES (USING THE EXAMPLE OF TOMSK)**

Issues of hydrogeological conditions of man-caused underflooding of urban territories using geoinformation technologies are considered. Hydrogeological information structure in the form of the electronic map of urban territory is described. Major operation methods of attribute information in order to evaluate the conditions of underflooding development of urban territory are shown.

UDC 556.314

E.M. Dutova, D.S. Pokrovsky**GEOCHEMISTRY OF GROUND WATERS OF THE ACADEMICHESKOYE FIELD**

Investigation results of geochemistry of ground waters of the Akademichesoye field, which is as a source of water supply to one of the largest regions of Tomsk are listed. Data on hydrogeochemical indicators change in the process of field development is described. Stable increase in values of ion sulphate and general rigidity of ground waters together with the decrease in concentrations of dissolved forms of iron migration are presented. Deposit aeration under the conditions of hydrodynamic mode during continuous development is the major factor of such changes. Change in hydrogeochemical indices in technological processes of water preparation and further transportation to the consumer is considered.

UDC 537.521

V.V. Zhukov, V.P. Krivobokov, S.N. Yanin**TARGET SPUTTERING UNDER ASSISTING OF MAGNETRON DISCHARGE BY MEANS OF ION BEAM**

A problem of magnetron discharge parameter control under its assisting by means of accelerated ion beam is described in this article. An attempt was made to remove a limitation of coating deposition rate under DC reactive magnetron sputtering caused by the formation of chemical compounds on the target surface. An effective method of chemical reaction products extraction from the sputtering surface based on ion assisting of magnetron discharge by means of accelerated ion beam is suggested. A combined sputtering system of magnetron diode and ion source with closed drift of electrons is considered. Main electrophysical and technological parameters of this system were studied. It is shown that significant increase of oxide film deposition rate may be

achieved under the consideration of definite conditions (input power, partial pressure of reactive gas, flow rate of working gas mixture etc).

UDC 535.361

V.F. Myshkin, A.N. Motorin

TRANSMISSION OF LASER RADIATION THROUGH ADSORBING LAYERS COMBINED WITH MINIMUM INTERFERENCE

The paper describes the interference method and the device for formation of the time-modulated flow of laser radiation. It is shown that such radiation flow with minimum interference coinciding with the adsorbing layer can pass without significant weakening.

UDC 621.039.586

V.I. Boiko, I.V. Shamanin, T.L. Safaryan

MIXED LOADING OF THE LIGHT-WATER REACTOR UNDER PRESSURE OF THORIUM-URANIUM OXIDE FUEL

The open thorium nuclear fuel cycle is considered as an alternative to the closed uranium-thorium one and as an addition to the successfully implemented uranium-plutonium cycle. This variant does not require principal changes in the design of serial light-water reactors of the last generation under transition to thorium-containing fuel and makes open fuel cycle possible when long and very long campaigns are carried out. Plutonium and highly enriched uranium get involved into the open thorium cycle as "hot" nuclides initiating output of uranium-233. Output and burning out of uranium-233 occurring at the same time are organized in such a way that limit values of burning of uranium-235, plutonium-239, uranium-233 and duration of campaigns are achieved.

UDC 621.039.52.034

V.I. Boiko, I.V. Shamanin, S.F. Kriger, T.L. Safaryan

DEFICIT OF DELAYED NEUTRONS IN MANEUVER MODE OF THE REACTOR VVER WITH PLUTONIUM LOADING

The particular features of neutron-physical processes in maneuver mode of the reactor VVER are considered. These processes are caused by the deficit of delayed neutrons when standard fuel is substituted for thorium-plutonium. The recommendations are formulated concerning modification of regulations of the reactor power control; the advantages of mixed loading of the active zone are given.

UDC 621.039.542.34

I.I. Loktev, A.B. Alexandrov, K.Yu. Vergazov, V.V. Guzeev

PREPARATION OF URANIUM DIOXIDE POWDERS FOR DRY PRESSING OF FUEL TABLETS. PART 2

The paper discusses preparation methods of uranium dioxide powders designed for manufacturing fuel tablets by means of powder metallurgy with the use of dry bunch. The paper suggests the algorithm of analysis of powder properties, methods of its treatment before pressing, pressing and sintering modes.

UDC 546.34/36

A.D. Ryabtsev

HYDROMINERAL RAW MATERIALS – INEXHAUSTIBLE LITHIUM SOURCE IN THE XXI CENTURY

The paper discusses the classification of hydromineral raw materials and the technologies of their industrial manufacturing for obtaining a wide range of lithium products.

UDC 546.34/36+541.183.123

N.P. Kotsupalo, A.D. Ryabtsev, A.A. Kurakov, L.A. Serikova, E.P. Guschina

COMPLEX PROCESSING OF LITHIUM-BEARING AND BROMIDE HIGHLY MINERALIZED BRINES

The new technologies for obtaining lithium compounds of bromine, bromic products, magnesium oxide, viscous materials and drilling fluids as well as iodine and strontium carbonate from natural highly mineralized brines and salt solutions were worked out.

UDC 546.07+546.632.34

L.T. Menzheres, A.D. Ryabtsev, E.V. Mamylova

SELECTIVE SORBENT FOR EXTRACTING LITHIUM FROM CHLORIDE HIGHLY MINERALIZED BRINE

The one-stage synthesis of sorbent on the basis of $\text{LiCl}_2\text{Al}(\text{OH})_3 \cdot m\text{H}_2\text{O}$ is worked out. The sorbent can selectively extract lithium from chloride brines at the temperature 20...40 °C.

UDC 546.623.34

N.M. Nemkov, A.D. Ryabtsev, V.V. Mukhin

OBTAINING HIGH-CLEAN MONOHYDRATE OF LITHIUM HYDROXIDE FROM LITHIUM-CONTAINING WASTES FROM DIFFERENT PLANTS

The paper suggests the technology for obtaining monohydrate of lithium hydroxide from technical lithium carbonate and lithium containing wastes of different plants.

UDC 546.34.131

L.A. Serikova, A.D. Ryabtsev, V.V. Mukhin

REPRODUCTION OF LITHIUM CHLORIDE THROUGH ADSORPTION OF ANODE CHLORINE OF WATER SUSPENSION OF LITHIUM CARBONATE IN THE PRESENCE OF CARBAMIDE

The paper suggests the technology of lithium chloride reproduction with the use of anode chlorine formed during manufacturing of metallic lithium.

UDC 621.039.342+661.1

G.M. Skorynin, I.I. Pul'nikov, G.A. Sharin, S.M. Zyryanov

OBTAINING PILOT LOT OF PURE SILICON TETRAFLUORIDE HIGHLY ENRICHED ACCORDING TO ISOTOPE SILICON-28 AT THE CASCADE OF GAS CENTRIFUGE

The pilot lot of pure silicon tetrafluoride with isotope ^{28}Si enrichment of more than 99,9 % is obtained. The chemical purity of the isotopic product accounts for more than 99,975 %.

UDC 543.552,541.138

S.V. Kovaljova, T.B. Rubinskaja, V.P. Gladyshev

PROCESSES ON A MERCURY ELECTRODE IN SOLUTION OF SELENIUM (IV)

The article suggests the mechanism of electrode processes taking place on a mercury filmed electrode while determining $\text{Se}(\text{IV})$ by means of inversion voltamperometry in the acidic medium.

UDC 541.128

N.V. Usheva, A.I. Levashova, O.E. Moizes, I.M. Fedyaeva, A.V. Kravtsov

SIMULATION OF TECHNOLOGICAL MODES OF FISHER-TROPSH SYNTHESIS

Influence of technological parameters is studied with the help of the mathematical model elaborated at the Department of Solid Fuel Chemistry of TPU. The analysis is performed on the basis of experimental data including those published in scientific literature. The applicability of the model for description of technological processes is studied.

UDC 621.316.8:691.372.001.24

T.M. Khalina

CALCULATIONS OF TEMPERATURE DISTRIBUTION ALONG THE SURFACE OF LOW-TEMPERATURE COMPOSITION ELECTRIC HEATING UNIT FOR AGROINDUSTRIAL COMPLEX

Analytical dependences were obtained and the results of numerical values calculations of temperature distribution along the low-temperature composition electric heating unit were presented, which can be used when designing similar units in different spheres of agriculture and industry.

UDC 621.384.001.63

W.K. Kuleshov, L.A. Redko, V.V. Redko**THE WAY OF STAFF PROTECTION WHEN CHECKING CABLE INSULATION WITH HIGH VOLTAGE**

Method of staff protection when working with high voltage taster of the insulation quality of cable articles to prevent the electric current hitting was proposed. This method is based on short-term periodical shut-down of the taster in case of human touching high voltage current-carrying chain. The estimation of the influence of realization of this method on the effectiveness of control was carried out.

UDC 620.1;620.179

N.N. Kononov**GROUND FOR NONDESTRUCTIVE METHODS APPLICATION TO EVALUATE QUALITY OF WELDED CONSTRUCTIONS OF LIFTING UNITS**

There are recommendations on how to choose the methods of non-destructive testing of welded constructions of lifting units taking into consideration the peculiarity of testing objects and types of activities when using nondestructive testing (production, repairs, technical diagnostics).

UDC 656:658.562

N.N. Kononov**BASIS OF THE NORMS OF WELDS DEFECTIVENESS OF LIFTING UNITS**

The welds are considered to be the most wide spread objects at nondestructive testing of lifting units. To carry out works connected with nondestructive testing the normative-technical documentation must be elaborated including permissibility norms of welding faults. Taking into account that process norms provide sufficiently high welds capacity for work they can also be used when assessing fault allowance operational requirements.

UDC 681.3.06

S.V. Didenko**THE AIM OF THE OPTIMISATION PROCESS OF NAVIGATION INFORMATION TRANSMISSION FROM MOVABLE OBJECTS INTO THE GLOBAL DATA NET**

The optimization process of navigation data transmission from movable objects into the global informational-telecommunication system is considered. The aim of optimal regulations is stated and the solution method is offered and described. This method takes into account some criteria and restrictions, which define the main regulation aim – the provision of the highest rate of data actualization about movable objects position in global telecommunication system.

UDC 004.82

A.F. Tuzovsky, V.Z. Yampolsky**THE ANALYSIS OF THE CONCEPTUAL MODELS OF WORK WITH KNOWLEDGE AS THE GROUND STAGE OF THE SYSTEM ARCHITECTURE OF KNOWLEDGE MANAGEMENT**

The conceptual models of working processes with knowledge in modern companies are considered: life cycle models of knowledge in the organization and the model of cooperative knowledge market. It is shown that the conceptual models are the basis for further researches of the composition and functionality of informational software of the developing systems of knowledge management.

UDC 004.047:007

A.F. Tuzovsky, I.A. Vasiliev, M.V. Usov**PROGRAM REALIZATION OF THE BASIC COMPONENTS OF INFORMATIONAL SOFTWARE OF THE KNOWLEDGE MANAGING SYSTEM**

The approach to informational software implementation of the knowledge managing system using representation language OWL and system of logical output RACER uses the descriptive logics to represent knowledge in the formal way.

UDC 338

O.V. Popov, N.N. Tsukublina**PERSONNEL STRATEGIES AS THE ELEMENT OF STRATEGIC PLAN OF HUMAN POTENTIAL DEVELOPMENT ON THE TERRITORY**

Stable development of the theory creates the object of research. The formation and development of citizens' potential, aims and methods of problems solution with the help of different power structures on the territory are considered.

UDC 364.2:571.16

O.V. Kozlovskaya**COMPLEX APPROACH TO THE ASSESSMENT OF POVERTY LEVEL IN A REGION (TOMSK REGION AS AN EXAMPLE)**

The paper deals with the strategy of poverty reduction, the basis of which is formed by the complex assessment of families' welfare. It takes into account not only the first level of cash income but also housing conditions, movables and immovables, consumer durable, possibility to obtain free social service (education, medicine). This research gave the possibility to build "the map of poverty" in Russia using the example of Tomsk region and to define priority directions and definite actions to decrease poverty, and also the indicators of strategy realization effectiveness.

UDC 331.108.2

E.G. Novoselova**PROBLEMS OF BANKING INNOVATION ACTIVITIES ORGANIZATION**

The issues of banking innovation activities organization are considered in this paper. It is stated that the level of bank sector development is determined by the financial market as a whole, by mechanisms of state regulation of banking activities. The efficiency of the banking system is characterized by the correspondence of bank services to the demands of the real sector of economy and by formation of bank innovations for further development of production. The mechanism of interaction of the object and subject of the innovation activity, operation and competitive sphere of banking activity is suggested.

UDC 330.01

L.V. Kusurgasheva**STRUCTURE OF THE ECONOMIC THEORY: CRITICISM OF THE POSITIVISM MODEL OF SCIENTIFIC KNOWLEDGE FORMATION**

The hypothetico-deductive model, based on the economic theory is considered in this paper. Its major stages are distinguished and its insufficiency due to the lack of correspondence between theory and practice is shown. A broader interpretation of the economic theory structure is given, which includes the overview of the reality under study, ideals and norms of cognitive activities and philosophical principles. Its heuristic and practical values are shown.

UDC 111.1:159.953

E.A. Tsibulevskaya, K.A. Ankudinova**NATURE OF POWER LEGITIMACY IN THE DISCOURSE OF TRANSITIONAL TYPE OF SOCIALITY**

The nature of power legitimacy in the discourse of transitional type of sociality is considered, the specificity of social institutions and values of transition time is revealed, the problem of society stability is discussed.

UDC 101.1:316

S.V. Dementyeva**PHILOSOPHICAL BASICS OF TOLERANCE AS MEGATREND IN THE CONTEXT OF NEW THREAT TO PEACE**

Major philosophical approaches to the interpretation of tolerance are given, the description of key philosophical problems discussed at the World Philosophical Congress in Istanbul is presented, and the

transition of the major social systems and problem of the search for urgency of the human national and peoples' identity through the value of tolerance is described. Interdisciplinary research paradigm of "world problems" facing the humankind is stated. Major markers of new threats to the world and humankind within the context of the international law, social philosophy, political science, sociology are presented in this paper. The role of the contemporary philosophical knowledge in the epoch of globalization is determined.

UDC 378:37.035.3(571.1/5)(09)

V.V. Petrik

HISTORICAL EXPERIENCE OF STUDENTS LABOR TRAINING IN 1958–1991 (USING THE EXAMPLE OF HIGHER SCHOOL IN SIBERIA)

The paper is devoted to the problems of students building detachments development at higher schools in Siberia during the period of 50's up to the early 90's of the XXth century. The author studies a number of questions related to their formation and the development of new forms of students building detachment activities. A special attention is paid to social and political aspects of student's labor training.

UDC 378.14

O.N. Imas, E.G. Pakhomova

LEVELING COURSE – ONE OF THE WAYS OF EDUCATION QUALITY IMPROVEMENT

Possible criteria of required knowledge testing in elementary mathematics among the first-year students are considered. This allows to introduce the leveling course for successful mastering of the higher mathematics program.

UDC 681.3.01

O.V. Marukhina, O.G. Berestneva, K.I. Rakhmatullina

WAYS OF DOUBLE VARIANTS OF TOPICAL TESTING ASSESSMENT ON THE BASIS OF STATISTICAL METHODS

The way of double variants assessment of current test in mathematics among the students of all faculties of Tomsk Polytechnic

University on the basis of mathematical statistic methods is presented in this paper. Analysis of test results for 2004 is stated and the corresponding conclusions concerning the doubling of the test variants are made.

UDC 539.3

V.M. Zamyatin, A.V. Anfilofyev

CENTURY ANNIVERSARY OF THE DEPARTMENT OF THEORETICAL AND APPLIED MECHANICS

The department is a union of general engineering educational and scientific areas of mechanics, which for a century have been forming the corresponding profile departments. Their structure and co-operation on various stages of Tomsk Polytechnic University development presented by the scheme with indication of all heads of the departments reflect tendencies of the past and present.

UDC 528(09)

G.P. Sergeevykh

SCIENTIST, ORGANIZER, PUBLIC FIGURE (105th BIRTHDAY ANNIVERSARY OF A.P. KAZACHEK)

November, 2, 2004 was the 105th birthday anniversary of Anatoli Petrovich Kazachek – vice rector of TPI for academic affairs, first assistant of A.A. Vorobyov. At his time A.P. Kazachek made a great contribution to the strengthening of scientific and laboratory basis of the institute, to the educational process improvement, enhancing the specialists training quality. A.P. Kazachek is remembered as a wonderful, exacting teacher and educator.

UDC 53(09)

M.V. Tkachenko

ORGANIZER AND THE FIRST DEAN OF PHYSICS AND TECHNICIANS (95th BIRTHDAY ANNIVERSARY OF VADIM NIKHONOVICH TITOV)

Life course of this organizer and creator of the Faculty of Applied Physics of TPI, Vadim Nikhonovich Titov is described in this paper (1909–1965).